

The Driving Vision: Pioneers of the EMR

The Permanente Journal asked some of the pioneers of KP's commitment to the electronic medical record to talk about the visions that drove them to dedicate much of their careers to translating the promises of the EMR into reality.

The Pioneering Physician Morris Collen, MD

Our original vision (of clinical information systems) started with Sidney Garfield, MD, as always, and my objective was simply to carry out Dr Garfield's vision. He'd come up with all these wonderful ideas. He always said, "We can never be perfect, and so we must continually try to improve our program."

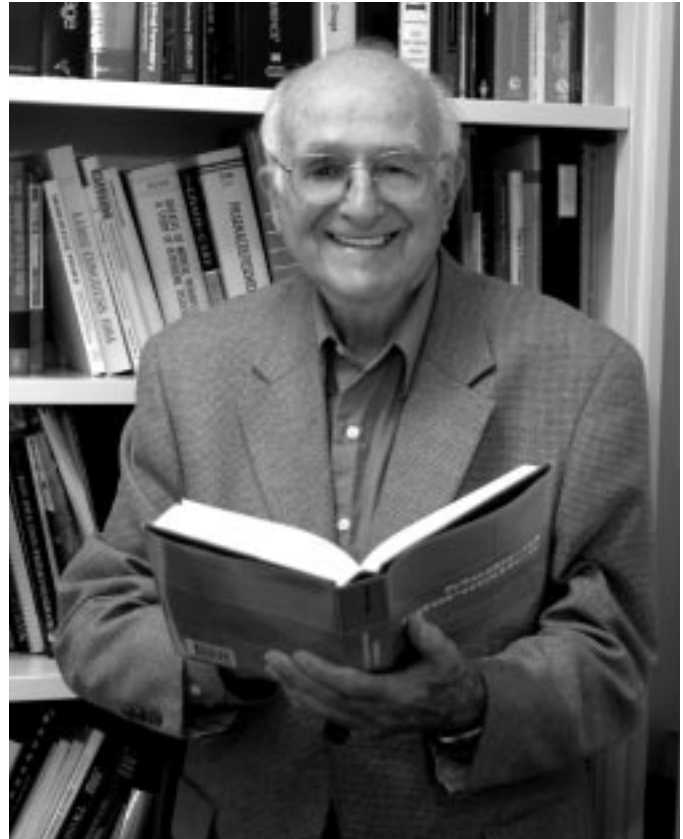
Dr Garfield knew that I had a degree in electrical engineering in addition to medicine. So he asked me to attend the first congress on medical informatics in New York and to come back and advise him. I remember getting all fired up at that congress about what was happening and the great potential for computers in medicine. So he and Cecil Cutting, MD (then Medical Director of The Permanente Medical Group) set up a new department so that I could devise and test computer applications, and that was the Medical Methods Research Department, which later became the Department of Research.

At that time, about 1960, we were already doing multiphasic health screenings for the Longshoremen's Union, but we were doing it manually, and that seemed like the ideal way to test computers on essentially healthy people. Everything about the multiphasic screening program was routine. People would go through the tests, and I would sit at the end of the line and check them off and arrange whatever follow-

up they needed. After a year of that, I got tired of it, so I asked our resident physicians to do it, and after a few months they got tired of it and asked the interns to do it, and they got bored with it because it was such a routine chore. It was exactly the kind of process that computers were suited for. And so automated multiphasic health testing became our first application of computers in medicine for patient care.

The government was impressed enough that they gave us some money to build a separate building for it. The computer alone was so big it took up a whole room with its own air conditioning, and it had less power than we now have on our desktop computers. We used punch cards, and as the patient went from station to station the information was punched in a card and at the end of the line we printed it all out and gave it to the physicians. My objective was to use these tools to provide better quality technically and to save physicians' time by not having them need to ask 200 questions when only 10% of them would be answered yes. So the physician would get a report on each patient with just those questions to which the patient had answered yes, and he wouldn't have to ask all the others.

Later on in the 1960s, we got another grant for the Medical Care Delivery System program, which included computerizing the inpatient and outpatient service at our San Francisco Hospital. We were going



For more than 40 years, Dr Morris Collen, a founding physician of The Permanente Medical Group, has been a driving force in bringing the electronic medical record from dream to reality in Kaiser Permanente, and throughout American health care.

to have the computer do essentially the beginnings of what is happening now, including physician order entry and results reporting. We didn't have it all, but we were looking forward to the time when we could. It was our goal to provide a comprehensive medical information system for all of our facilities, with patient records available no matter where the patient presented. For our San Francisco patients, we had every outpatient visit, every drug dispensed, every lab test—it was in the computer to be called up in the middle of the night or

anytime. It was a giant step, and we visualized essentially doing what the new EpicCare system will do for us today.

Then, in 1970, the country had an economic recession and our grants were eliminated and that terminated our program. The Emergency Room physicians in San Francisco almost wept because they lost this great service. Donald Lindberg, MD, who was the director of the National Library of Medicine, said that at the time, we had the leading system in the whole world.

And so that's how it got started.

Clinical Information Technology

Allan T Khoury, MD, PhD

We started planning for our clinical Information Technology (IT) implementation in 1988. Our Medical Director at the time was Ron Potts, MD, and he realized that computers were going to play a big role in medicine. He asked me to explore the field.

I've always viewed clinical IT as a great way to improve the quality of care we deliver to our members. I thought this could happen in two ways: first, by providing a synopsis of crucial, relevant information from each patient visit, so the doctor wouldn't be treating the patient blindly. Second, it had become clear by the mid-1980s that computers could enhance quality by generating reminders to physicians at the moment of care—so-called decision support—about things that needed to be done but were simply being overlooked. We set out to build our own system that would do these two things. The initial goal was not to replace the paper record but to use the computer as a quality improvement tool.

We started with the printed chart summaries in 1990; and in 1993, we printed reminders at the point of care. We were on a shoestring budget, just \$83,000 the first year. That is

probably one of the reasons we were successful; since the number was small, we were allowed to experiment. Our early success led to deployment of a more complete electronic medical record, starting in 1994 and 1995, when we realized that by using scanning we could capture progress notes and probably eliminate the need for the paper chart entirely.

When I took this on, I did it on the condition that I retain control of disease management and prevention activities, because it was clear to me that unless we could move quickly to improve quality, the IT project would be seen as something that consumes lots of money without much benefit.

Without having that dual role, disease management and clinical IT, we wouldn't have been able to demonstrate benefit as quickly as we did.

What I'm looking forward to in KP HealthConnect is the robust decision support capability, such as drug-drug and drug-disease interaction reminders generated by the order entry system. Our current system doesn't have this functionality. We should be able to reduce admissions from errors in outpatient drug ordering by as much as two thirds. That's pretty compelling.

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With an initial budget of just \$83,000, Dr Allan Khoury (shown here in front of KP-Ohio's "GuitarMania II" art piece) lead the creation of a home-grown electronic medical record for KP Ohio a decade ago. His vision of the EMR as a key tool for quality improvement has helped pave the long road to KP HealthConnect.

HealthConnect won't do. I'd like there to be an artificial intelligence engine overlooking what the physician is doing. Since KP HealthConnect will be able to code patient symptoms and capture test results, it should be able to evaluate the diagnoses recorded by the doctor and, if necessary, suggest alternatives. Also, I think as the hardware gets better, we'll even-

tually have notepad computers that are light enough to carry around, permit charting anywhere, and allow clinicians to draw pictures, which will help dermatology, ophthalmology and some other specialties. We're not there yet, but all this is possible.

Special Feature

THE PROMISE

The Dream: Availability of Information 24/7

Peggy Latare, MD

In this day and age, with the number of diagnostic tests and the complexity of medical science being what it is, it feels so backward to try to still practice medicine in the way we did before we had a clinical information system, when the only information we had was what we could piece together from the mainframe system and what the patient might remember. That's really the prize that I've kept my eyes on for so long—that availability of information 24/7. No matter what else the electronic medical record does, that's the dream: to have that information available and to have people out there making decisions with all the information they need.

Here in Hawaii, we're on our third implementation of an Information Technology solution—two less robust technologies preceded the KP HealthConnect

implementation—and it's quite remarkable that people still have the energy and the excitement to do it one more time. But it's because of the power of having that information available and the connectivity from primary care to specialty care, from small clinic to large clinic and from island to island, that the excitement is still there.

Since we first began to implement the earlier CIS system here, the objectives have evolved. Although the availability of the medical record is still key, the amazing decision-support capabilities in Epic compared with the earlier systems is now a key driver—the ability to reduce variation and track results and outcomes. The other thing that's different now is that Epic has brought our business colleagues

and inpatient colleagues into the picture, and so now the vision of truly being able to follow information across the continuum of inpatient/outpatient and ER is a major part of the excitement.

In terms of transformation, we saw that even within three or four months of implementation, some

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really innovative things were happening—such as physicians spending an hour or two a few days a week on the phone, just doing triage to handle patients' concerns and avoid some appointments. That practice is still diffusing, so that in a number of our clinics three or four days a week, one of

the doctors will be on the phone working on follow-up questions that are easily handled on the phone. Eventually, I see that



Peggy Latare, MD, is the KP HealthConnect Project Executive for the Hawaii Permanente Medical Group.

happening all over the region and not just in primary care but in specialty care, where we can offer a lot more alternatives to care. And with the MyChart and messaging capabilities of KP HealthConnect, we're going to end up having a good deal of our care happen virtually. That's very exciting. ❖

The Future

The future belongs to those who dare.

— Anonymous